

Amendments to the Claims:

Please amend claims 1, 19 and 37.

These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter, or agreement with any objection or rejection of record.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A composition comprising a plurality of structurally ordered nanostructures in a matrix comprising one or more components that are chemically cross-linked or capable of chemically cross-linking to one or more of the nanostructures, wherein the nanostructures comprise group III-V, group II-VI or group IV semiconductors or alloys, and wherein the one or more matrix components interact to form a plurality of receiving structures capable of accommodating the nanostructures and providing ordering and/or orientation of the nanostructures.
2. (Original) The composition of claim 1, wherein the structurally ordered nanostructures comprise substantially non-randomly oriented nanostructures.
3. (Original) The composition of claim 2, wherein the non-randomly oriented nanostructures comprise nanostructures substantially aligned with respect to one another.
4. (Original) The composition of claim 2, wherein the non-randomly oriented nanostructures comprise nanostructures substantially aligned with respect to a selected axis.
5. (Original) The composition of claim 4, wherein the composition is positioned proximal to a substrate, and the selected axis is substantially perpendicular to a surface of the substrate.

6. (Original) The composition of claim 1, wherein the plurality of structurally ordered nanostructures comprises a substantially regularly-ordered array of nanostructures.
7. (Original) The composition of claim 1, wherein the plurality of structurally ordered nanostructures comprises an irregularly-ordered arrangement of nanostructures.
8. (Original) The composition of claims 1, wherein the nanostructures comprise spherical, ovoid, elongated or branched structures.
9. (Original) The composition of claim 8, wherein the nanostructures comprise nanocrystals, nanodots, nanospheres, nanorods, nanowires, nanotetrapods, dendrimer branching structures, or combinations thereof.
10. (Original) The composition of claim 8, wherein the nanostructures comprise inorganic nanostructures.
11. (Cancelled)
12. (Previously presented) The composition of claim 1, wherein the components of the matrix self-assemble to form the matrix.
13. (Previously presented) The composition of claim 1, wherein one or more components of the matrix are chemically crosslinked or capable of chemically cross-linking to one another.
14. (Cancelled)
15. (Previously presented) The composition of claim 1, wherein a component of the matrix comprises multiple nanostructure-binding components.
16. (Original) The composition of claim 1, wherein the composition comprises two or more matrix layers, each member layer comprising a plurality of structurally ordered nanostructures.
17. (Original) The composition of claim 16, wherein the member nanostructures in a first matrix layer are substantially aligned with respect to the member nanostructures in an adjacent matrix layer.

18. (Original) The composition of claim 16, wherein the member nanostructures in a first matrix layer are not substantially aligned with respect to the member nanostructures in an adjacent matrix layer.

19. (Currently amended) A composition comprising a plurality of structurally ordered nanostructures comprising group III-V, group II-VI or group IV semiconductors or alloys, wherein members nanostructures further comprise one or more alignment ligands associated with the nanostructures, and wherein a first alignment ligand on a first member nanostructure interacts with a second alignment ligand on an adjacent member nanostructure, thereby structurally ordering the plurality of nanostructures.

20. (Original) The composition of claim 19, wherein the structurally ordered nanostructures comprise substantially non-randomly oriented nanostructures.

21. (Original) The composition of claim 20, wherein the structurally ordered nanostructures comprise substantially aligned nanostructures.

22. (Original) The composition of claim 19, wherein the first and second alignment ligands comprise the same molecule.

23. (Original) The composition of claim 19, wherein the first and second alignment ligands comprise different molecules.

24. (Original) The composition of claim 19, wherein the first and second alignment ligands comprise self-organizing molecules.

25. (Original) The composition of claim 19, wherein the first and second alignment ligands comprise complementary binding pairs.

26. (Original) The composition of claim 25, wherein the complementary binding pairs comprise two or more molecules having a selected molecular recognition functionality.

27. (Original) The composition of claim 26, wherein the first and second alignment ligands comprise an amine-containing moiety or an alcohol-containing moiety, or both.

28. (Original) The composition of claim 26, wherein the first and second alignment ligands comprise one or more biomolecule pairs.

29. (Original) The composition of claim 28, wherein the biomolecule pair comprises an antibody and an antigen that binds to the antibody; biotin and avidin; a lectin and a carbohydrate ligand; complementary nucleic acids; a protein and a ligand; a receptor and a ligand; an aptamer and an aptamer ligand; or a combination thereof.
30. (Original) The composition of claim 19, wherein the first alignment ligand and/or the second alignment ligand comprise two or more selected molecular recognition functionalities per alignment ligand.
31. (Currently amended) The composition of claim 19, wherein the nanostructures comprise spherical, ovoid, elongated or branched structures.
32. (Original) The composition of claim 31, wherein the nanostructures comprise nanocrystals, nanospheres, nanorods, nanowires, nanotetrapods, dendrimer branching structures, or combinations thereof.
33. (Original) The composition of claim 19, wherein the interaction between the first and second alignment ligands comprises an ionic interaction, a covalent interaction, a hydrogen bond interaction, an electrostatic interaction, a coulombic interaction, a van der Waals force interaction, or a combination thereof.
34. (Original) The composition of claim 19, wherein the first and second alignment ligands comprise one or more functionalized head group capable of binding to a nanostructure surface or to a ligand associated with the nanostructure surface.
35. (Original) The composition of claim 34, wherein the functionalized head group comprises one or more phosphonic acid, carboxylic acid, amine, phosphine, phosphine oxide, carbamate, urea, pyridine, isocyanate, amide, nitro, pyrimidine, imidazole, salen, dithiolene, catechol, N,O-chelate ligand, P,N-chelate ligand, or thiol moieties.
36. (Original) The composition of claim 34, wherein the chelate N,O ligand comprises ethanol amine or aniline phosphinate.
37. (Currently amended) A plurality of clusters of structurally ordered nanostructures dispersed in a matrix on a surface of a substrate, wherein long axes of the nanostructures are aligned substantially parallel to the substrate surface.

38. (Original) The plurality of nanostructure clusters of claim 37, wherein the structurally ordered nanostructures comprise selectively-oriented nanostructures.

39. (Original) The plurality of nanostructure clusters of claim 37, wherein an orientation of the selectively-oriented nanostructures is substantially aligned with a selected axis.

40. (Original) The plurality of nanostructure clusters of claim 39, wherein the selected axis is substantially perpendicular with respect to a surface of the substrate.

41. (Original) The plurality of nanostructure clusters of claim 39, wherein the selected axis is substantially parallel with a surface of the substrate.

42. (Original) The plurality of nanostructure clusters of claim 37, wherein the nanostructures comprise nanorods or nanowires.

43-67. (Cancelled)